## Space Weather Forecast

Issued on Wednesday, 03 July 2024 at 13:11 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Chance of Moderate-class flares throughout. Chance of Active to G1/Minor storm intervals Day 1 (03 Jul) due to Coronal Mass Ejection (CME) influences.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Moderate, with a Moderate-class flare from a small region in the southwest at 03/0741 UTC. Despite being small and simple, it has been responsible for two M-flares in the last few days. There are now twelve regions on the disc, the majority of which are small and simple. A region near south-centre disc is currently the largest and most complex region. However, it has lost much of its magnetic complexity and the majority of its trailing spots have limited penumbra. To the north of this, another region has developed a little in the last 24 hours, but remains fairly simple. A region in the northeast quadrant is very elongated but rather small in areal extent and simple in terms of magnetic complexity. A new region has recently emerged onto the southeast limb, but is not yet fully visible so the classification may change as it rotates further onto the disc.
The Moderate-class flare mentioned above has produced a Coronal mass Ejection (CME) but there is limited satellite imagery at present to assess this. However, it appears unlikely to be Earth directed. No other Earth directed CMEs have been observed in imagery during the past 24 hours.

**Solar Wind / Geomagnetic Activity:** Solar winds showed a decline to background levels. Wind speeds declined from around 400 to near 330 km/s. The Interplanetary Magnetic Field was weak throughout, but with a slight increase during the period. The north-south component varied weakly. Geomagnetic activity was Quiet (Kp 1-2).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) has remained at background levels with no solar radiation storms occurring.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Low activity is most likely, with a chance of further isolated Moderate-class flares.

**Solar Wind / Geomagnetic Activity:** A CME was observed leaving the Sun on 29 June, which may give a glancing blow at Earth on Day 1 (03 Jul), however confidence is low, with significant uncertainty in the timing of this feature. No other Earth directed CMEs are currently expected, and there are no significant coronal holes in a position to give any fast wind influence during this period.
Geomagnetic activity is expected to be generally Quiet to Unsettled (Kp 1-3), with a chance of Active to G1/Minor storm (Kp 4-5) intervals on Day 1, should the CME arrive.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a very slight chance of exceeding the S1/Minor Storm threshold should any notable flares occur from the numerous sunspots that currently occupy the visible disc.

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 30 | 5 | 1 | 1 |
| Strong | G3 | No | 5 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | No | 40 | 40 | 40 | 40 |
| Very Active | R3 to R5 X | No | 5 | 5 | 5 | 5 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 5 | 5 | 5 | 5 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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